

CONSUMER ELECTRONIC SHOW in Las Vegas was attended by myself and at least four subscribers. The Bally technical contingent included all the names we've seen as originators of programs. It was a pleasure to meet those people who up to then were only telephone voices. The Add-On Unit was officially introduced at a press conference Saturday. It will go into production; it has a price scheduled at \$650 or less; and a delivery date of June-July. A reprinted brochure is included herein. Note the comparison of attributes with other current systems. As you can see, the full-up capability will be equal or better than comparably priced equipment. In addition, a unique feature of the machine is called 'Concurrent Processing', where more than one program can be run at once. The speed of operation is inverse to the number of programs being simultaneously conducted, apparently no real limit. They had a little sit-down theatre, and put on a show every hour with the Add-On, showing its capabilities, primarily in the area of graphics which is the most visible feature. The unit was used in a slide-show mode, where the hand control trigger was used to change "slides" while the knob was used to move a cursor up and down to pick items off a menu. Various illustrations had been made with a light pen or directly and stowed, then called up as desired. A small airplane was "assembled" from component parts and smoothly 'flown' across the screen. Time was available for question/answers. Remember, the show is for retailers and distributors, no public. A printer and mini-floppy were attached, but Bally is still saying that just about anyone's peripherals will be compatible. (these were not Bally-built items) The Add-On can search for a particular file on a peripheral and load it, at 2400 baud. The unit will have PEEK and POKE capability. The name of the total system is now Bally Computer System, so save those Arcade and Home Library Computer labels, they will be collectibles. The new Football game was shown in an adjacent semi-secluded booth. It allows the offensive team a choice of plays, then shows the field with all the players, running, blocking, etc., then the results of the play. Part of the 'show' included a demonstration of the Concurrent Processing scheme, where the screen was split vertically and the left side did the random box routine while the right side did the random line program.

THREE VIDEOCADES should be available right now, according to Ron Schwenk (916-944-2001) who said that Football (25.) Maze and Space Race (20. each) should be in his hands next week - so I'm sure other dealers will be receiving theirs as well.

NEW BASIC MANUAL is being distributed with the cartridge. The only difference I could see in content was the addition of a mention of the &(16) thru &(25) sound system. I will get a copy for inclusion in the next issue.

CASSETTE INTERFACE WIRING DIAGRAM is included. I was told of two changes in the circuit, should be obvious on the print. I've also heavied up some of the lines.

&(9) is a very interesting area. and I was introduced to some of its complexities by Brett Bilbray who commented on the mention in the last issue. As a result, I have included a pageful of my observations as a personal attempt at understanding it. I'd like to include more descriptive material - can anyone help???

ONE SUBSCRIBER asked for a grid to locate x,y points - I'd suggest that one put up a BOX 0,0,179,87,1 and then accurately measure it, and make a plastic grid overlay, as TV screens vary in size of picture or position of picture on the screen.

"NEW" COMMANDS unearthed by Tom Wood are included with this issue.

RM = REMAINDER is interesting. Normally the TBASIC swallows the remainder of a division and only tells you of the whole number part of the answer. But with the knowledge of RM, we can convert it to a decimal and print it, as:

```
INPUT A
INPUT B
C = A ÷ B
D = RM X 1000 ÷ B
PRINT C, ".", D
```

This will give you an answer that is a bit disjointed, as 3. 421. But Chuck Thomka reminded me of the PRINT #A,B statement. It bunches the printed parts together (as 3.421) so they look normal. Change the last command to

```
PRINT #1,C,".",D
```

to get this effect. There are limitations to the size of RM X 1000.

FORMAT VARIATIONS using the PRINT #A,B can be illustrated by a modification of the above program. Retain the first 4 lines, then

```
FOR N = 1 TO 20
PRINT #N,C,".",D
NEXT N
```

RS-232 SOURCE has been reported to me as R.W.Electronics, Inc. 3203 N. Western Ave, Chicago 60618. A 6½' cable molded to a 9-pin female connector at .50 each or 10 for \$4.

MODEM is barely mentioned on the cassette interface box, but nowhere else. I understand that a tape recorder speaker output has gone over the telephone lines to another recorder's microphone, but that's pretty crude. We now have a telephone modem prototype here, and should have more details next time.

:PRINT is normally used with the ;LIST command to transfer data from machine memory to tape, but that's only part of the story. Dick Strauss and Brett Bilbray have discovered that :PRINT alone turns on the hand control port 3 for output. Other commands can now take effect, and so if you tell the machine to LIST, it will, and the data goes out the port. Most everyone has had the experience of punching in a lengthy program and then inadvertently touched the RESET, and poof, all is gone. Well, here is insurance. Start the recorder on Record, punch in :PRINT, and everything you key in will get taped. If there is a RESET, or the machine crashes for some reason, you can just load the tape back in and go on. Or just keep going and load the early portion later.

RUN automatically after loading the tape into the machine? Sure, the Bally tapes do. Remember that after you open port 3 with the :PRINT statement you can write anything on the keyboard and it will go on the tape. So, after the listing has been completed, punch in RUN and that's it.

ANOTHER WAY to make it run is to complete the loading, then punch in ;GOTO 10, as discovered by Jim Unroe. The GOTO would be helpful if you wanted to start a program at some specific location other than the beginning.

COMMAND	EXAMPLE	EXPLANATION
CALL(n)	CALL(16384)	Performs a machine level program jump to decimal location (n). In the example, this jump will be to location 4000 Hex.
&(n)=m	&(16)=0	Outputs m to decimal port (n). The example sets the master sound divider to a divisor of 0.
m=&(n)	A=&(18)	Inputs decimal port (n) to variable m. The example inputs player 1 knob to variable A.
\$sm,n,o	\$x@ (0),@ (18),@ (36)	Allows use of the "executive" math routines. The example causes multiplication of the 16 digit number at @ (0) by the 16 digit number at @ (18), leaving the product at @ (36). The s may be +, -, x, or divide.
:RUN	:RUN	Loads data from cassette into locations 4000H to 407FH. Upon completion of load, performs a machine level jump to location 4000H.
*PRINT	*PRINT	Same as :PRINT, but will not record on tape any words entered with WORDS shift key.
STOP	STOP	When encountered in a running program, causes an exit back to BASIC.
%(n)=m	%(20078)=32768	POKE command. The example sets variable A to 32768 since 20078 happens to be the memory address for storage of variable A.
m=%(n)	A=%(20080)	PEEK command. The example sets variable A to the value of variable B.
LIST m,n	LIST 100,10	Lists the n lines starting with line m.

There are two variables available that aren't mentioned in the BASIC manual: The first is RM which appears to be the remainder of a division action. The second variable is XY which is the current X and Y position of the LINE command (i.e. the next LINE starting point). Using XY (and, for that matter, %(n)) requires some care, since BASIC treats these variables as if they were formatted decimal constants even though they are, in reality, two consecutive memory locations.

Tom Wood
14 Dec 78

500 BAUD AUDIO CASSETTE INTERFACE

add

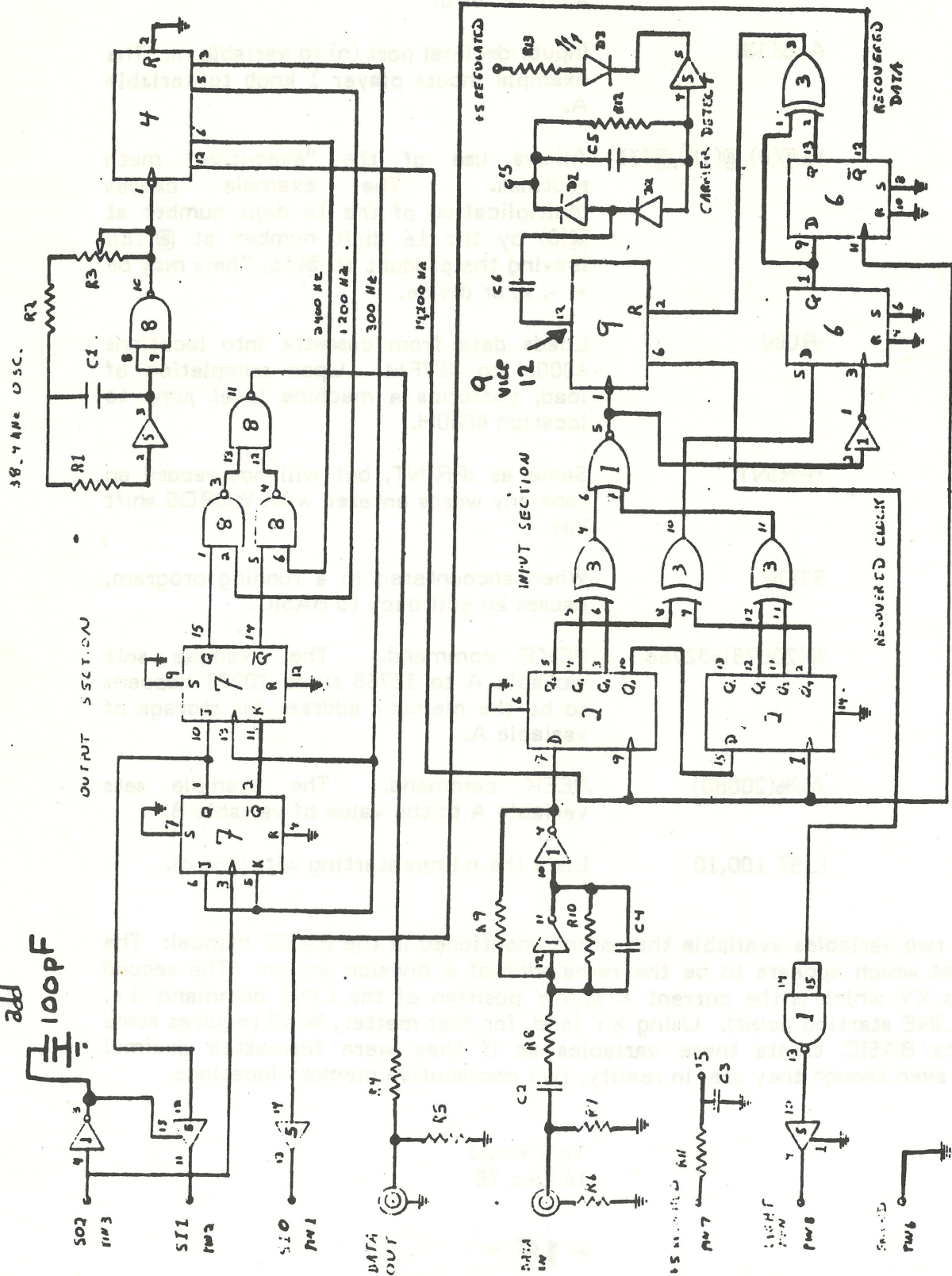
100pF

- R1 330K C1 390pF
 R2 15K C2 .1uF
 R3 20K 100T C3 22mF
 R4 470K C4 100pF
 R5 1K C5 470pF
 R6 100A C6 470pF
 R7 47A
 R8 10K D1 1W4142
 R9 1M D2 1W4142
 R10 100K D3 RED LED
 R11 270K
 R12 10M
 R13 370A

I C

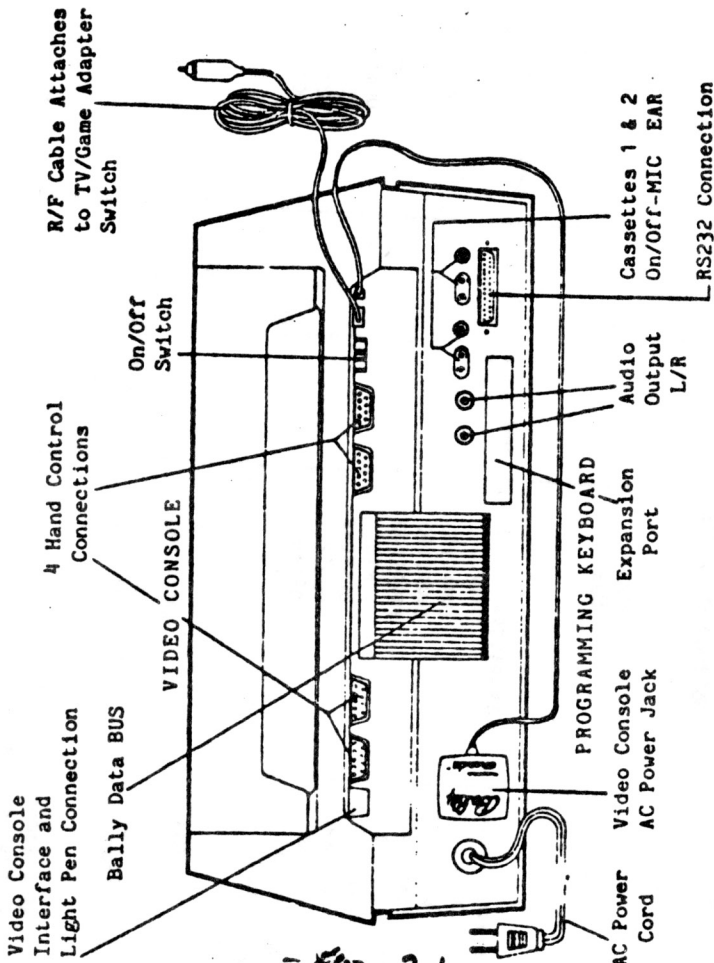
- 1 4572 HEX GATE
 2 4015 DUAL 4 BIT SHIFT REGIST
 3 4070 QUAD EXCLUSIVE OR
 4 4024 SEVEN STAGE COUNTER
 5 1503 HEX 3-STATE BUFFER
 6 4013 DUAL 2 FLIP FLOP
 7 4037 DUAL 3-K FLIP FLOP
 8 4011 QUAD NAND
 9 4024 SEVEN STAGE COUNTER

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Bally Computer System

REAR VIEW SHOWING INPUT/OUTPUT PORTS



COMPATIBLE PERIPHERAL EQUIPMENT

- Cassette Decks: Any (AC power only, counter favorable)
- Printers: Any RS232 compatible
- Floppy Disc: Both single and dual mini-floppy with compatible interface
- Telephone Modem: Any RS232 compatible

BALLY CONSUMER PRODUCTS DIVISION
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Bally brings the excitement home!



COMPUTER SYSTEM

Specifications

(VIDEO CONSOLE & PROGRAMMING KEYBOARD)

MICROPROCESSOR

Z80 operating at 1.78MHz

MEMORY

32K Byte Read Only Memory (ROM). (24K Byte resident in programming keyboard add-on of which 4K Byte is dedicated to a floating point software package which allows scientific calculations within 10^{199})

CASSETTE I/O PORTS

- Dual cassette
- Software, motor control
- 2,400 baud

VIDEO OUTPUT

Text Display:

- 26 char./line, 11 lines, upper and lower case
- 40 char./line, 20 lines, upper case
- 80 char./line, 24 lines, with optional TV printer

Graphic Configuration:

- 160x102

Graphic Resolution:

- 16,320

INPUTS

- 24-key calculator keypad
- 60-key typewriter-style keyboard
- 3-level w/144 character set
- 4 hand controls

AUDIO

- Dual channel output with each having independently definable volume level

POWER

110-125V AC, 50-60 Hz

SERIAL I/O PORT

- RS232
- Software selectable 300 to 19.2K baud
- 5 pin "D" type connector for printer or modem

PARALLEL I/O PORT

- 50 pin
- Buffered expansion port which allows interfacing to future peripherals

Comparative Analysis: Personal Computers

	BALLY Computer System	APPLE II	COMODORE PET	RADIO SHACK TRS-80 Level II	EXIDY Sorcerer	COMPUCOLOR Renaissance
MICROPROCESSOR No. Instructions Internal Registers	280 158 17	6502 151 3	6502 151 3	280 158 17	280 158 17	8080 78 7
PROGRAM STORAGE ROM (Read Only Memory) RAM (Random Access Memory) Mass Storage Interface	32K 8K standard dual audio cassette	8K 8K standard cassette	14K 8K standard cassette (resident)	4K 16K standard cassette included	12K 8K standard dual cassette	16K 8K standard mini- floppy disk
INPUTS Typewriter Keyboard (# Keys) Numeric Cluster (Calculator) Game Control Handles Floating Pt. Software Pkg.	U/L case* (60) YES-24 keys YES YES	U only (50) NO YES NO	U only (73) YES-20 keys NO YES	U only (53) NO NO NO	U/L case* (63) YES-16 Keys Optional YES	U only (71) NO NO YES
OUTPUTS Max. Character Display Text Display (Char. xlines) Graphic Resolution Graphic Configuration B&W or Color (# Colors) Audio Printer Floppy Disk Storage Telephone Modem Video Output Device	286/800 26x11/40x20 16,320 160x102 Color (256) 2 Channel Optional Optional Optional Home TV	960 40x24 1,920 40x48 Color (16) 1 Channel Optional Optional Optional Monitor (or Home TV Optional)	1,000 40x25 128,000 320x400 B&W None Optional N/A Optional Monitor included	1,024 64x16 6,144 128x48 B&W None Optional** Optional** Optional** Monitor included	1,920 64x30 122,880 240x512 B&W Optional Optional Optional Monitor additional	1,024 64x16 98,304 384x256 Color (8) None Optional Standard Optional Monitor included
MULTI-SOURCE OF ATTACHMENTS RS232 Expansion BUS S-100 Expansion BUS	YES NO	YES YES	NO NO	NO NO	YES YES	YES NO
PRICE (Suggested Retail)		\$1,195.00 excluding monitor	\$795.00	\$899.00	\$895.00 excluding monitor	\$1,395.00

*Upper and lower case characters
**A Special Expander Interface must be purchased in order to use these peripherals